What is claimed is:

1. A membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer; and

said electrode catalyst layer has a total sum volume of pores falling within the pore diameter range from 0.01 to 30 μm, of pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst.

2. The membrane-electrode structure according to claim 1, wherein the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm.

3. A polymer electrolyte fuel cell in which in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between

both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

4. The polymer electrolyte fuel cell according to claim 3, wherein the ion conducting polymer contained in the electrode catalyst layer of said cathode electrode has a weight ratio falling within the range from 1.2 to 1.8 in relation to said carbon particles.

5. The polymer electrolyte fuel cell according to claim 3, wherein the electrode catalyst layer of said cathode electrode is bonded by thermal transfer to said polymer electrolyte membrane, and the pore diameter distribution of the pores formed by said pore forming member in said electrode catalyst layer, before thermal transfer, comprises a third peak in the pore diameter range equal to or more than 5 μm, and

wherein the height of said third peak falls within the range from 0.9 to 1.8 $\mu l/cm^2 \cdot mg$ catalyst in terms of the pore volume.

6. An electric appliance wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

7. A transport machine wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas less than 50% in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a low humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being higher than the height of said second peak.

8. A polymer electrolyte fuel cell in which in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01

to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.

9. The polymer electrolyte fuel cell according to claim 8, wherein the ion conducting polymer contained in the electrode catalyst layer of said cathode electrode falls within the weight ratio range from 1.0 to 1.6 in relation to said carbon particles.

10. The polymer electrolyte fuel cell according to claim 8, wherein the electrode catalyst layer of said cathode electrode is bonded by thermal transfer to said polymer electrolyte membrane, and the pore diameter distribution of the pores formed by said pore forming member in said electrode catalyst layer, before thermal transfer, comprises a third peak in the pore diameter range equal to or more than 5 μm, and

wherein the height of said third peak is 0.18 $\mu l/cm^2 \cdot mg$ catalyst or more in terms of the pore volume.

11. An electric appliance wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition, wherein:

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm and a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.

12. A transport machine wherein a polymer electrolyte fuel cell is used in which:

in the membrane-electrode structure comprising an anode electrode, a cathode electrode and a polymer electrolyte membrane made of a sulfonated polyarylene based polymer and held between both electrodes, a fuel gas is supplied to said anode electrode, an oxidant gas of 50% or more in relative humidity is supplied to said cathode electrode and electric power is thereby generated under a highly humidified condition,

said cathode electrode comprises an electrode catalyst layer containing a catalyst particle having the catalyst loaded on the carbon particles, a pore forming member and an ion conducting polymer of the weight ratio falling within the range from 1.0 to 1.8 in relation to said carbon particles, and is in contact with said polymer electrolyte membrane through said electrode catalyst layer;

said electrode catalyst layer has a total sum volume of the pores falling within the pore diameter range from 0.01 to 30 μm, of the pores formed by said pore forming member, equal to or more than 6.0 $\mu l/cm^2 \cdot mg$ catalyst; and

the pores formed by said pore forming member have a pore diameter distribution comprising a first peak falling within the pore diameter range from 0.01 to 0.1 μm a second peak falling within the pore diameter range from 0.1 to 1.0 μm, the height of said first peak being lower than the height of said second peak.